

9. ACCEPTANCE CERTIFICATE

Image Intensifier Tube

	Minimum	Measured
Resolution, lines/mm	30	
Photocathode sensitivity, integral, $\mu\text{A}/\text{lm}$	400	
Light amplification	20,000	

Image Intensifier Tube Serial Number: _____

Date of production: _____

Quality Inspector Signature: _____

NIGHT VISION DEVICE

NVS 7-2 NVS 7-2SD NVS 7-2HD NVS 7-2WA

NVS 7-2XT NVS 7-3HD NVS 7-3XT

The device with serial number _____ corresponds to all technical specifications and is admitted for usage.

Date of production: _____

Quality Inspector signature: _____

Quality assurance seal



Operation Manual



NIGHT VISION BINOCULARS/GOGGLES
NVS 7

NSN: 5855-20-000-8284

IMPORTANT INFORMATION

Read prior to activation

You have just purchased a complicated electronic device. To operate it properly, please read this manual carefully. Here are some common precautions that must be noted.

- **NEVER** disassemble the unit. This device contains high voltage, which may be hazardous to your health!
- **NEVER** expose the opened objective lens of an active unit in daylight. At daytime objective lens must be covered by caps. There is a tiny hole in the cap to provide enough light for daytime operation. It is allowed to turn on the unit at daytime, but caps must cover the lenses.
- **NEVER** aim active unit at intense light sources (i.e. lights, headlamp, campfires, the moon, etc.)
- **NEVER** reverse the polarity of a battery
- **NEVER** connect the unit to external power sources
- **ALWAYS** remove batteries when not in use for a long period
- **ALWAYS** keep the objective lenses covered when not in use
- **ALWAYS** store in a warm dry place when not in use

8. CUSTOMER SUPPORT

Should you experience any difficulties with your NEWCON OPTIK product, consult the enclosed manual. If the problem remains unresolved, contact our customer support department at (416) 663-6963 or toll free at 1-877-368-6666. Our operating hours are 9am-5pm, Monday - Friday, standard East time. At no time should equipment be sent back to Newcon without following the instructions of our technical support department.

NEWCON OPTIK accepts no responsibility for unauthorized returns.

To locate NEWCON Authorized Dealer call:

Tel: (416) 663-6963 Fax: (416) 663-9065

Email: newconsales@newcon-optik.com

Web: www.newcon-optik.com

The defective products should be shipped to:

From USA only: 2331 Superior Ave. Cleveland, OH 44114

From all other countries: 105 Sparks Ave., Toronto, ON M2H 2S5, CANADA

7. WARRANTY:

NEWCON OPTIK warrants this product against defects in material and workmanship for one year from the date of the original date of consumer's purchase, but no more than 18 months from the date of manufacturing. Longer warranty periods are available, subject to the terms of specific sales contract. Should your Newcon product prove defective during this period, please bring the product securely packaged in its original container or an equivalent, along with proof of the date of original purchase, to your Newcon dealer. Newcon will repair (or at its option replace), the product or part thereof, which, on inspection by Newcon, is found to be defective in materials or workmanship.

What This Warranty Does Not Cover:

NEWCON OPTIK is not responsible for warranty service should the product fail to be properly maintained or fail to function properly as a result of misuse, abuse, improper installation, neglect, damage caused by disasters such as fire, flood, lightning, improper electrical current, or service other than by a NEWCON Authorized Service. Postage, insurance, or shipping costs incurred in presenting your NEWCON product for warranty service are your responsibility. Please include a cheque or money order made out to NEWCON OPTIK for the amount of \$15.00 to cover shipping and handling within North America.

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**THANK YOU FOR PURCHASING THE NVS 7
TYPE NIGHT VISION
BINOCULARS/GOGGLES. PLEASE DEMAND
TO CHECK THE DEVICE FOR PROPER
OPERATION WHEN BUYING IT. PLEASE
READ ALL THE INSTRUCTIONS
CAREFULLY BEFORE USE.**

Precautions

NVS 7 is a sophisticated precise optical instrument equipped with electronics.

Therefore, it should be handled with due care.

- Try to avoid strong heat, direct sunlight, impacts, dust, moisture and sudden changes of temperatures. Keep in mind that, although being very durable, NVS7 contains fragile components.
- Do not touch the optical surfaces with fingers. Doing so may damage the anti-reflection coating.
- Cleaning of optical surfaces is allowed only with professional camera lens cleaning supplies.
- To clean the exterior of the device, use only a soft clean cloth.
- Do not take the cover off the lens if not necessary.
- Keep away from heating appliances and central heating.
- Make sure to switch off the unit and remove the batteries during periods of non-operation and when storing the device for long period of time.
- Do not apply superfluous efforts at work with lens assembly, agile elements and thread connections.
- Due to considerable optical magnification of the eye-piece some small structures inside the Image Intensifier Tube coating in the form of dark and/or white points may be seen in the field of view. This does not affect the serviceability of the device.

6. TROUBLESHOOTING

The device does not work.

Check that the battery is installed properly.

Check the charge of the batteries. Replace them if they are weak.

The image does not appear in focus.

Bring the inspected object to the center of the image. Rotate the eyepieces (6) to achieve the clearest image on the screen. Then obtain the most clear-cut image of the object focusing the lens (2). Repeat the steps of focusing if necessary

If the view still does not seem in focus, clean the lenses - they could be foggy or dusty.

Unit flashes

It is normal for the unit to flash within the first 2 minutes of activation. If the flashing continues afterwards the following is a possible cause: bright environment (even with the caps closed!)

Condensation accumulates on the parts.

It is O.K. to use the unit in cold. However, when the unit is brought from the cold into a warm environment, it has to warm up for up to 2 hours (not minutes!).

Only then it is allowed to turn it ON again.

Visibility decreases and / or disappears.

Bright light sources (moon, projectors or headlights) may cause visibility to degrade or even completely disappear. Move the device away from the light source immediately.

The image should be restored in within 2 minutes. Poor atmospheric conditions such as fog, haze or extremely dark environments will decrease the visibility distance of the unit.

Press the button (2) to change the fixating point of the goggles during operation. Rotate the goggles with depressed button (2) until you hear the click. You can raise the unit up vertically for unobstructed vision without taking the helmet off. The unit will automatically shut off in this position. **(Note: this is an optional feature)**. Reverse the operation to turn it on.

All other operations with goggles mounted on a helmet are identical to those with the head gear.

1. OVERVIEW

The NVS 7 type night vision is observational optico-electronic binoculars/goggles, intended for examining objects and orientation at nighttime or dark conditions. The unit utilizes a generation 2+ or 3 image intensifier tube, which amplifies available moonlight, starlight or man-made light. The device was designed to be easy to use, and provide many years of operation.

Some of the typical activities where NVS 7 will be useful:

- Law enforcement
- Wildlife observation
- Security
- Search and rescue
- Hunting
- Photography (Dark room operation)

Features

- Waterproof construction
- Built-in infrared illuminator allows observations in total darkness (i.e. basement, cave or dark room);
- Flip/flop mechanism allows easy unobstructed vision;
- Independently adjustable eyepieces;
- Ideal in situations requiring hands-free operation;
- Lightweight and comfortable;
- A soft rubberized eyepiece makes the viewing more comfortable.

WARNING! NEVER OPERATE YOUR NIGHT VISION DEVICE IN DAYLIGHT WITHOUT THE LENS COVER ON!
NEVER DIRECT THE LENS IN THE DIRECTION OF BRIGHT LIGHT!

2. COMPONENTS

NVS 7 is supplied with the following components:

PART	QUANTITY
NVS 7 unit with 1x lens *	1
Head gear*	1
Lens caps	1
Manual	1
Warranty registration card	1

Optional parts **

PART	QUANTITY
3x add-on lens	1
4x lens	1
8x lens	1
Sacrificial lens	1
Demist shields	2
Soft case	1
Hard case	1
Neck strap	1
Lens brush	1
Lens cloth	1
AA batteries	2

* In a binocular configuration the unit is supplied with 4x or 8x lens without head gear, and without 1x lens

** Exact delivery set and accessories included are subject to the terms of specific sales contract.

5.5 Using the helmet mount (optional)

NVS 7 can be equipped with an optional helmet mount. This mount is customized for a particular type within the wide variety of existing helmet models. The mount is attached to a helmet with stripes. The goggles are fixed to the mount by a locking screw (1). Adjust the goggles position on your eye level with the screw (4). Then adjust the eye-relief (the distance between your eyes and the eyepieces), which should be about 25 mm. In order to achieve this, loosen locking screw (1) and set a comfortable distance between the eyes and the eyepieces; then tighten the locking screw back.

You can fixate the unit in three predetermined positions: vertical, horizontal, and 15-20 degrees above horizontal. The angles between these positions cannot be changed, but the starting point is adjusted by screws (3). If you loosen them, you can rotate the flip-flop mechanism to find the most suitable starting fixating point. Don't forget to tighten the screws (3) after adjustment.

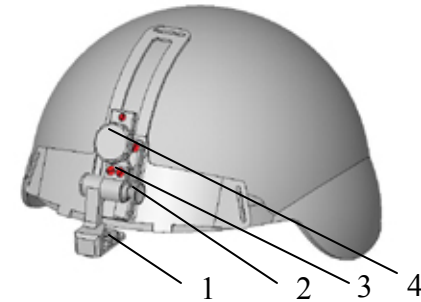


Figure 7

1 – locking screw; 2 – flip/flop button; 3 – flip-flop adjusting screws; 4 – mount binding screw

OPERATION:

During daytime: It is allowed to turn on the goggles at daytime for a short period of time, for testing purposes only. Lens cap must be installed during this operation. The image will be fuzzy, and/or you will see 3 images. This is normal because of the catadioptric construction of the lens.

Warning. Never turn on the goggles with either 1x or 4x lens during daytime, without the lens caps. Doing so will result in damaged power supply and/or tube and costly repairs not covered by the warranty.

During night time: Remove the lens cap by unscrewing it counter clockwise. Keep the lens cap in a safe place, so it won't get lost. Use the focusing ring at the base of the lens in order to adjust the image. You will need to readjust the image for different objects at different distances.. You should expect to have a sharp image for distances as close as 10-20m through infinity.



Figure 5
NVS 7 with 4x lens



Figure 6
NVS 7 with 8x lens

3. SPECIFICATIONS OF NVS 7

Model	NVS	7-2	7-2SD	7-2HD	7-2XT	7-2WA	7-3HD
Image Intensifier Tube (IIT)		18 mm Gen. 2+				25 mm Gen. 2+	18 mm Gen. 3
IIT model		NC104322	NC064322	NC064322	NCXT4322	NC064331_25	N3064322
IIT resolution, lp/mm		30-36	40-45	45-57	57-72	45-64	45-72
Field of view, °		40				60	40
Eye relief, mm		25				15	25
Objective focal length, mm		27.5				24.76	27.5
Objective F / T numbers		F1.2 / T1.25				F1.35 / T1.4	F1.2 / T1.25
Magnification, x		1					
Interpillary distance, mm		58-72					
Focus range, m		0.25-∞					
Dioptric correction		±5					
Battery type		2 standard AA batteries					
Battery life, hours		Over 80 hours without I/R; over 30 hours with I/R					
Low battery indicator	-		√			√	√
I/R ON indicator	-		√			√	√
Momentary I/R button	-		-			√	-
Automatic shut-off in the up-rise position (optional)	-		√			√	√
Waterproof 2 m, 2 hours	-		√			√	√
Dimensions, mm		150x120x55					
Weight, kg		0.480					

NOTE: As the design is being continuously improved some descriptions may differ from those given above.

Main tube parameters

Image Intensifier Type (Generation/Grade)	2+ / SD, HD, XT	3 / HD
Photocathode operating diameter, mm	18	
Photocathode type	S-25	GaAs
Photocathode sensitivity, min:		
Integral, $\mu\text{A}/\text{lm}$	500-750	1200-2100
Spectral at $\lambda = 850 \text{ nm}$, mA/W	35	45
Light amplification	25,000	
Image magnification	1	
Max dark background brightness, cd/m^2	$1 \cdot 10^{-3}$	
Signal-to-noise ratio, min	18-25	18-24
Current consumption, max, mA	20	25
Voltage, V	2.8±0.8	
Tube life until reduced parameters, hrs	10,000	
Keep time, years	15	
Ambient temperature range, °C	-50 ... +55	

Spatial frequency-contrast characteristic

Frequency, lines/mm	Contrast transfer Coefficient (HD)	Contrast transfer Coefficient (XT)
2.5	0.89	0.92
7.5	0.68	0.80
15.0	0.40	0.58

Field of view cleanness

Zone #	Zone Diameter, Mm	Maximum diameter of defects			Admitted area of defects, total, mm^2
		Neglected	Admitted		
			\varnothing , mm	Qty	
1	0 – 9.0	0.10	0.15	2	0.15
2	9.0 - 14.4	0.12	0.25	3	0.30
3	14.4 -18.0	0.15	0.35	3	0.50

5.4 Installation and operation of optional lenses

INSTALLATION:

Note: The following procedure is identical for 4x or 8x lenses. Unpack the 4x lens from the box. Turn off the NVS 7 goggles. Remove the rubber lens cap (6). Remove (unscrew) the original 1x lens, which is included with the NVS 7 goggles. To do that, hold the lens at its base (1) and unscrew it counter clockwise. Once the original 1x lens has been removed, store it in a safe, clean space (you can use the 4x lens packaging for that). The NVS 7 4x lens should be screwed, clockwise, instead of the 1x original lens. Please exercise extreme caution at the initial stage.

The threads are very fine (to prevent humidity penetration) and can be damaged easily. Do not force the lens rotation. If it does not screw in smoothly, remove it and make sure that the threads are matching correctly. Now it is ready for operation. Removal of the lens is done in reverse order.

Warning: The lens should screw in smoothly. If not, remove it and make sure that the threads are matching correctly. Failing to do so and forcing the installation of the lens will result in broken threads and costly repairs to both the goggles and the 4x lens.

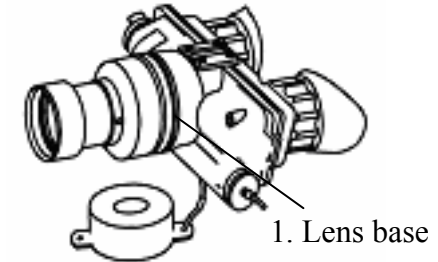


Figure 4

5.3 Operation at night

You can use the device with the head gear or without it. When used with the head gear, first adjust all the straps for individual head size. Take off the lens covers (6) from the lens (7). Turn on the device-using switch (1). In case of insufficient lighting when observing an object, which is situated not far from the viewer, turn on the I/R illuminator by turning the I/R switch (1). The red indicator (Fig. 3) will be on.

Note: The I/R illuminator is visible to anybody with a night vision device and will disclose the user's presence.

You can raise the unit up for unobstructed vision without taking the head gear off by using the "flip/flop" feature (Fig. 2). To switch the unit into off-working position: press the lever (9) down and raise the device into vertical position, until you hear a click. The unit automatically shuts off in the upright position (**Note: this is an optional feature**).

Reverse the operation for a working position.

After operation the user should turn off the unit by rotating switch (1) to the OFF position. Put protective lens caps (6) on the lens (7). After operation remove the batteries from the battery compartment to avoid any damage of the device in case of occasional leakage of electrolyte from the batteries.

4. CONSTRUCTION

1. On-Off, I/R Switch
2. Mounting socket
3. Eyepiece adjustments
4. Eyepieces
5. Battery house cover
6. Objective lens cover
7. Objective lens focus
8. Tightening screw
9. Lever

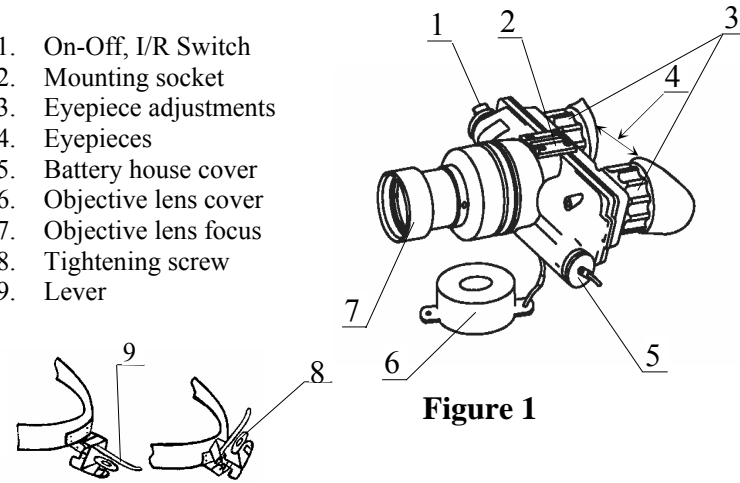


Figure 1

Figure 2

5. OPERATION INSTRUCTIONS

5.1 Pre-starting procedures:

Unpack the device. In order to install the battery, first make sure the switch (1) is in the OFF position. Unscrew the battery house cover (5), and install 2 fresh AA batteries. Observe the correct polarity indicated on the housing. Screw the battery house cover back on. Check the functioning of the device by switching it on (rotate switch (1) and looking through eyepieces (4). Make sure the lens cap (6) is on while operating during the daytime. If power supply and the batteries are O.K., you will see greenish-lit screen. If the screen is not lit, check the batteries. Replace the batteries if necessary.

There are one or two indicators in the visible zone (see Fig. 3).

When they are off the user can hardly notice them. Bright yellow and/or flashing red indicates that battery voltage goes low. You should have the fresh batteries ready and replace them in time. Bright red reminds / warns the user that the I/R illuminator is on (see below).

If everything works, now is a great time to fill the warranty card.

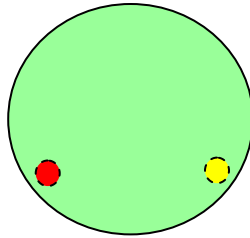


Figure 3

I/R illuminator and low battery indicator (red)
Optional separate low battery indicator (yellow)

5.2 Testing of operation:

When wearing the unit the eye-relief (the distance between your eyes and the eyepieces) should be 15-22 mm. In order to achieve this, loosen locking screw (8) and set a comfortable distance between the eyes and the eyepieces; then rotate the locking screw (8) back. Turn on the device by rotating the switch (1) to the ON position. The green screens of the scopes must be lit. Direct the device on an object placed within 8-15m from the viewer. Rotate the eyepieces (4) and the lens (7) in order to achieve the sharpest image on the screen of the image tube. The eyepieces (4) are set for a person individual eye sight, and do not need to be changed if the same person is using the apparatus. The lens (7) focus needs to be adjusted according to a different distance of observed scenery.

The distance between the eyes should be automatically applicable for people with 58-72 mm interpupillary distance, which covers over 99% of the adult population.